

REMARKS

Claims 200 and 202-212 are pending in this application. Applicant reserves the right to pursue the original claims and other claims in this and other applications. Please reconsider the above-referenced application in light of the foregoing amendment and following remarks.

Claims 200, 202-204, 206, and 209-212 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Yamada et al., U.S. Patent No. 5,223,726 ("Yamada") or, in the alternative, under 35 U.S.C. § 103 as being obvious under Yamada. The rejection is respectfully traversed.

Applicant respectfully submits that Yamada does not disclose, teach or suggest the claimed invention. More specifically, Yamada does not disclose, *inter alia*, "excavating a trench within a semiconductor substrate of a first conductivity type, said trench having a substantially vertical internal surface region and bottom surface region; performing a first ion implantation of a second conductivity type into said substantially vertical internal surface region and bottom surface region at a first ion implantation angle; and performing a second ion implantation of said second conductivity type into said substantially vertical internal surface region and bottom surface region at a second ion implantation angle, wherein said first implantation angle is orthogonal to said second ion implantation angle," as recited by claim 200.

Yamada, on the other hand, teaches a substrate with a first implantation of a first conductivity type (p-type) in the trench hole and a second implantation of a second conductivity type (n-type) *over and after* the p-type implantation or first conductivity type. (Col. 5, line 67- Col. 6, line 8). Thus, the second implantation of the second conductivity type in Yamada has an intermediate layer between the second conductivity type and the trench/substrate. This intermediate layer is the first

implantation of the p-type conductivity. This differs from the claimed invention. The claimed invention recites performing first and second ion implantations of the second conductivity type on the substrate, and more specifically into "said substantially vertical internal surface region and bottom surface region" of the trench within the substrate. That is, in the claimed invention, there is no p-type implantation within the trench before the second conductivity type is implanted as in the Yamada method. As such, claim 200 is allowable over Yamada.

Further, in FIGs. 5(g)-5(h), Yamada teaches that "p conductivity type impurities are ion implanted to the trench hole in the opposite directions *each* perpendicular to the charge transfer direction." (Col. 5, line 67-Col. 6, line 2) (emphasis added). Even if Yamada discloses more than one ion implantation, *each* of Yamada's ion implantations would be conducted in a same perpendicular direction to the charge transfer direction. Claim 200, however, recites "performing a first ion implantation . . . *at a first ion implantation angle*; performing a second ion implantation . . . *at a second ion implantation angle*; wherein said first implantation angle is orthogonal to said second ion implantation angle." (emphasis added). In addition, in FIGs. 5(i)-5(j), Yamada teaches that "n conductivity type impurities are ion injected to the inside of the trench hole in a *rotating slanted manner*." (Col. 6, lines 6-8) (emphasis added). This differs from the claimed invention. The first ion implantation angle is orthogonal to the second ion implantation angle. Yamada, on the other hand, teaches that the second conductivity type is injected in a "rotating slanted manner," and not orthogonal as in the claimed invention. Accordingly, Yamada does not disclose, teach or suggest the claimed invention.

Claims 202-204, 206, and 209-212 depend from claim 200 and are allowable along with claim 200 for at least the reasons provided above. Accordingly, Applicant respectfully submits that the rejection should be withdrawn and the claims allowed.

Claims 205, 207, and 208 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamada in view of alleged admitted prior art. This rejection is respectfully traversed.

Claims 205, 207, and 208 depend from claim 200 and are allowable along with claim 200 for at least the reasons provided above. As discussed above, Yamada does not disclose, teach or suggest the claimed invention. The alleged admitted prior art adds nothing to rectify the above-noted deficiencies associated with Yamada. The alleged admitted prior art is relied upon for disclosing that BPSG, PSG, or BSG are well-known materials for passivating a device and CMP is a well-known planarizing method. As a result, the § 103(a) rejection of claims 205, 207, and 208 should be withdrawn and the claims allowed.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to review and pass this application to issue.

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Respectfully submitted,

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